



NATIONAL CENTRE OF EXCELLENCE IN GEOLOGY UNIVERSITY OF PESHAWAR

I. INTRODUCTION

The National Centre of Excellence in Geology (NCEG), University of Peshawar, is an institution of higher learning and research in geosciences. It was established in 1974 under an act of the parliament. The functions of the NCEG include:

- To engage in goal-oriented high level teaching and research
- To establish M.Phil. and Ph.D. in the relevant disciplines in accordance with the standards and requirements of the UoP
- To promote cooperation and inter-disciplinary relationship with other teaching and research establishments
- To arrange conferences, seminars and refresher courses for the development of teaching and research.

The NCEG has been successful in the pursuit of these aims and objectives and has developed an efficient program of post-graduate studies and research. It has a faculty strength of 36, of which 16 are Ph.D. holders, 11 are at various stages of completing PhD at universities in USA, Canada, UK, Germany, Austria and Italy and 9 hold MS/M.Phil. degrees. The faculty has diversity in their specializations, education background (USA, UK, Australia, Canada, Germany, Netherland, Italy and Pakistan), and research focus. NCEG faculty and students have published more than 600 research papers, five special volumes, five books and sixteen colored maps of different parts of Pakistan. The Centre is publisher of a high quality regional research journal entitled “*Journal of Himalayan Earth Sciences*”. The journal is the only HEC recognized (Y category) journal in Earth

Sciences in Pakistan having published 45 volumes since its inception as Geological Bulletin, University of Peshawar in 1964.

The Centre has produced 79 M.S/M.Phils, 23 Ph.D's and 246 Post-Graduate Diploma graduates, some of them currently holding leadership positions in geosciences related industry, R&D organizations and academia in Pakistan and abroad. Several faculty members of the NCEG are fellows/members of the prestigious academic societies such as Pakistan Academy of Sciences, Geological Society London and Geological Society of America. NCEG faculty has earned international and national recognition in terms of Fulbright Awards (7), Commonwealth Awards (2), Civil Awards (Hilal-i-Imtiaz (1), Sitara-i-Imtiaz (2), Tamgha-i-Imtiaz (2)), Presidential Awards (Izaz-i-Fazeelat (2)), Star Laureate (2), PAS Gold Medals (5), IUCN-Environmental Awards (2), Earth Scientists Awards (4) and Research Productivity Awards (4) for their outstanding contributions to science and education in Earth Sciences.

NCEG has distinction of receiving and completing several national and international development projects. Two PC-1 schemes worth Rs.39.9 million and Rs.36.954 million for the up-gradation of the Centre's library and laboratories, respectively, have been recently completed under the auspices of the Higher Education Commission, Islamabad. ECNEC approved PC-1 scheme worth of Rs.800 million is underway for the Up-gradation of NCEG to an institute of international standing. NCEG is currently implementing following major international and national research projects:

1. Integration of Geological and Remote Sensing Data for Finding Source Rocks for Gold in the Northern Areas of Pakistan funded by the US State Department and Higher Education Commission.
2. Regional Geochemical Exploration for Precious Metals in Southern Parts of Khyber Pakhtunkhwa funded by the Directorate General of Mines & Minerals, Minerals Department, Government of Khyber Pakhtunkhwa.
3. Watershed Management & Land Rehabilitation, NW Frontier Region, Pakistan in collaboration with ICARDA.
4. NCEG, (University of Peshawar), Universities of Leicester, Prague, Keele and Kabul are tied through an international project titled "The Institutional Strengthening of Universities at Kabul and Peshawar (Afghanistan and Pakistan) through support to Earth and Environmental Sciences". This project is sponsored by DELPHE (Development Partnership in Higher Education) of British Council.
5. Rhizoremediation of Oily Sludge Soils of Potwar Plateau.
6. Space Technology for Municipal Planning and decision making process, a case study of Peshawar, under DOST.

II. LABORATORIES

NCEG is one of the most well-equipped institutions in the country in the field of Earth, Environmental, Geospatial and Geophysical Sciences. The laboratories include:

1. Electron Microprobe
2. XRF
3. XRD
4. Geochemistry
5. Thin Section Preparation
6. Petrography
7. Gemology
8. Crushing/Powdering/Sample Preparation
9. GPS Geodesy
10. GIS/RS
11. Paleontology
12. Petroleum Geochemistry
13. Environmental Geochemistry
14. Geophysics
15. Geotechnical/Engineering Geology
16. Radon Lab

III. NATIONAL LIBRARY OF EARTH SCIENCES

The library of the Centre houses about 7000 books and dozens of journals in the fields of Earth, Environmental, Geospatial and Geophysical Sciences. It has been recently upgraded to the National Library of Earth Sciences (NLES) where hundreds of recently published books and dozens of most recent journals with complete sets of back issues have been added. Many of the international journals are available online. The digitization of the Library is under process and in this respect all the volumes of the Journal of Himalayan Earth Sciences (1964-2010) and the M.Phil. and Ph.D. dissertations have been digitized and are available on the Centre's website. The library automation software has been installed and configured, and is accessible for local users at Peshawar university campus. In the next step it will be digitally connected to other universities and R&D organizations working in the fields of Earth and Environmental Sciences and relevant areas from within the country and abroad. The NLES may be visited online at <http://nceg.upesh.edu.pk/nceglibrary/>

IV. SEMINAR/LECTURES/CONFERENCES/WORKSHOPS

The faculty and students of the Centre are regularly presenting their research papers in conferences/workshops and invited talks in the universities within the country and abroad every year. The Centre is regularly arranging national and international conferences/workshops on various aspects of the Earth and Environmental Sciences. These activities provide a platform for geoscientists to share their ideas and also provide an opportunity to establish linkages and collaborations of the faculty with the national and international scientists. In last five years, NCEG has organized the following major conferences/workshops:

1. International Conference on “Sustainable Utilization of Natural Resources, Khyber-Pakhtunkhwa-FATA held at Perl Continental Hotel, Peshawar on February 11, 2013.
2. Workshop on Development Partnership in Higher Education project, from February 11 -15, 2013.
3. Short Course in construction Material Testing Geotechnical Training Course October 15 – 18, 2012.
4. International Workshop on Adaptation to Natural Hazards in Changing Global Climate Scenario, COMSTECH, Islamabad, September 25-27, 2012.
5. International Conference on “Earth Sciences Pakistan 2012” held at Baragali Summer Campus, June23-24, 2012.
6. International Workshop on Modern Tools for the evaluation of Seismic induced ground shaking and associated secondary hazards for Earth Quake vulnerability from June 11–22, 2012 at Nathiagali.
7. Capacity Building in Research Skills April 25 & 26, 2012.

V. ACADEMIC PROGRAMS

Degrees

The Centre offers 4 degree programs in the following Earth Science disciplines;

- Geology
- Geophysics
- Environmental Geosciences
- Geospatial Sciences

Pre-Requisites for Admission

The terminal degree requirements for admission in four disciplines are as follows:

	Degree/Discipline	Pre-Requisites
1.	Geology	M.Sc./BS (4 years) in the fields of Geology, Geophysics and Engineering (Geotechnical/Mining/Civil) from the HEC recognized universities with the required division/CGPA as per regulations of the University of Peshawar.
2.	Geophysics	M.Sc./BS (4 years) in the fields of Geophysics, Geology, Physics, Mathematics and Engineering (Geotechnical/Mining/Civil) from the HEC recognized universities with the required division/CGPA as per regulations of the University of Peshawar.
3.	Environmental Geosciences	M.Sc./BS (4 years) in the fields relevant to Earth and Environmental Sciences and Engineering from the HEC recognized universities with the required division/CGPA as per regulations of the University of Peshawar.
4.	Geospatial Sciences	M.Sc./BS (4 years) in the fields relevant to Earth and Environmental Sciences and Engineering from the HEC recognized universities with the required division/CGPA as per regulations of the University of Peshawar.

Additional eligibility criteria for admission in NCEG degree programs are as per requirement of the University of Peshawar.

Degree Requirements

M.Phil./MS degree program requirement is a course work of minimum 24 credit hours (CHs), followed by a research-based thesis.

M.Phil./MS leading to Ph.D. degree program requirement is completion of a course work of minimum 24 CHs, passing of a Comprehensive Examination and completion of additional 18 CHs course work followed by a research-based Ph.D. thesis.

Direct Ph.D. degree program for candidates having MS/M.Phil. degree requires completion of a minimum of 24 CHs course work (700 and above), passing of Comprehensive Examination followed by a research-based Ph.D. degree.

List of Approved Courses

I. RELATED COURSES (GENERAL)

M.Phil./MS students enrolled in all the 4 Degree Programs are required to complete 6 CHs from the following Related Courses (General).

Course No.	Title of Course	Cr. Hrs.
Related Courses (General)		
Geol.500	Computer Application for Earth Sciences	2
Geol.501	Computing with MATLABORATORY	3
Geol.505	Mathematics / Statistics	2
Geol.510	Geostatistics	2
Geol.515	Technical Writing	2
Geol.520	Chemical Methods of Rock Analysis	2
Geol.525	Advance Instrumentation	3

II. SPECIALIZED MAJOR COURSES

The scholars enrolled in MS/M.Phil. degree program are required to complete at least 12 CHs from the following Specialized Major Courses relevant to their chosen discipline.

The scholars enrolled in MS/M.Phil. leading to Ph.D. degree program are required to complete 21 CHs Courses from the following Specialized Major Courses (12 CHs courses prior and 9 CHs courses later).

The scholars who earned MS/M.Phil.degrees and are directly enrolled in Ph.D. degree program are required to take 12 CHs courses from the following Specialized Major Courses (preferably other than those courses taken in their MS/M.Phil. degree program).

GEOLOGY

Major Courses (Specialized)		
Geol.700	Depositional Environments	3
Geol.701	Transitional Environments & Facies	3
Geol.705	Basin Analysis	3
Geol.710	Industrial Mineralogy	3
Geol.712	Carbonate Microfacies	2
Geol.718	Neotectonics	3
Geol.719	Soil mechanics	3
Geol.720	Geological Site Investigations	3
Geol.721	Tectonics of Foreland Basins of Pakistan	2
Geol.722	Coal Geology	2
Geol.723	Rock mechanics	3

Geol.730	Hydrogeology	3
Geol.731	Engineering Geology	3
Geol.732	Quaternary Geochronology	3
Geol.733	Techniques in Structural Geology	3
Geol.734	Kinematic and Dynamic Analyses	3
Geol.735	Ore Microscopy	3
Geol.736	Mineral Processing and Beneficiation	3
Geol.740	Invertebrate Paleontology	3
Geol.741	Vertebrate Paleontology	3
Geol.742	Stratigraphic Analysis	3
Geol.743	Micropaleontology	3
Geol.745	Alkaline Igneous Rocks	2
Geol.750	Tectonics of Northern Pakistan	3
Geol.751	Interpretation of Geological Maps	3
Geol.752	Tectonics	3
Geol.753	Low-Temperature Geochemistry	3
Geol.755	Thrust Tectonics	2
Geol.757	Genesis of Ore Deposits	2
Geol.760	Exploration Geochemistry	3
Geol.761	Mineralogy	3
Geol.765	Ore Deposits Geology	3
Geol.767	Metallogeny and Mineral Deposits of Pakistan.	2
Geol.770	Metamorphic Structures	3
Geol.771	Gemology	3
Geol.772	Techniques in Field Geology	3
Geol.775	Specialized Field & Laboratory. Techniques in Structural Geology	3
Geol.777	Igneous Petrology	3
Geol.780	Geochemistry	3
Geol.783	Sedimentary Petrology	3
Geol.785	Metamorphic Petrology	3
Geol.788	Petroleum Geology	3
Geol.789	Petroleum Engineering	3
Geol.792	Petroleum Geochemistry	3
Geol.795	Non-Clastic Sedimentology	3
Geol.798	Clastic Sedimentology	3
Geol.799	Seminar (Teaching/Research of selected topics)	1-3

Geol.800	Diagenesis of Sediments	3
Geol.801	Techniques in Paleontology	2
Geol.802	Sequence stratigraphy	3
Geol.803	Micro-tectonics	3
Geol.806	Biostratigraphy	3
Geol.807	Palynofacies analyses	3
Geol.808	Instrumental Techniques in Organic Geochemistry	3
Geol.810	Continental Environments and Facies	3
Geol.812	Marine Depositional Environments	3
Geol.814	Gold Exploration and Evaluation	3
Geol.815	Geochronology	3
Geol.820	Regional Tectonics	3
Geol.821	Tectonic Geomorphology	2
Geol.825	Metallogeny and Plate Tectonics	3
Geol.830	Economic Evaluation in Exploration	3
Geol.835	Geological Data Analysis in Mineral Exploration	3
Geol.840	Plate Tectonics & Kinematic of Plate Movements	3
Geol.841	Fission Track Dating of Rocks and Minerals	3
Geol.845	Mesosopic Structures	2
Geol.850	Advanced Igneous Petrology	3
Geol.851	Advance Hydrogeology	3
Geol.852	Advance Soil Mechanics	3
Geol.855	Advanced Geochemistry	3
Geol.860	Advanced Metamorphic Petrology	3

GEOPHYSICS

Major Courses (Specialized)		
Geop.700	Geophysics	3
Geop.705	Applied geophysics	3
Geop.710	Formation Evaluation (theory + Laboratories)	3
Geop.730	Seismic Stratigraphy	3
Geop.735	Geophysical Techniques in Hydrogeology (theory + Laboratories)	3
Geop.740	Rock Magnetism	3
Geop.805	Engineering Seismology	3
Geop.810	Earthquake Seismology	3

ENVIRONMENTAL GEOSCIENCES

Major Courses (Specialized)		
Envg.700	Geological Waste Management	3
Envg.705	Soil Classification	3
Envg.710	Geology of Earthquakes	3
Envg.715	Disaster Mitigation	3
Envg.720	Land Contamination and Remediation	2
Envg.725	Environmental Geology (Part I)	3
Envg.726	Environmental Geology (Part II)	3
Envg.735	Seismic Hazard Analyses	3
Envg.740	Geo-environmental Mapping	3
Envg.750	Natural Hazards: Assessment, mapping and Mitigation Tools	3
Envg.810	Paleoclimatology (Part-I)	3
Envg.811	Paleoclimatology (Part-II)	3
Envg.815	Environmental Geochemistry	3
Envg.820	Climate Change	3

GEOSPATIAL SCIENCES

Major Courses (Specialized)		
Geos.700	Global Positioning System	2
Geos.705	Geographical Information Systems (GIS)	3
Geos.710	Remote Sensing	3
Geos.715	Digital image processing	3
Geos.720	Cartography	3
Geos.725	Land Surveying	3
Geos.735	Geodesy	3
Geos.800	Spatial Data Modeling using GIS	3
Geos.805	Advance Remote Sensing	3
Geos.810	Application of GIS and RS to Hazard Mapping	3
Geos.815	Application of Geo-informatics in Natural Resource Management	3

III. MAJOR RELATED COURSES

The scholars enrolled in MS/M.Phil. degree program are required to complete at least 6 CHs from the Major Courses given above (under section II) other than their chosen

discipline. For example, candidates seeking degree in Geophysics will select any 6 CH major courses in disciplines other than Geophysics (i.e., Geology, Environmental Geosciences and Geospatial Sciences).

The scholars enrolled in MS/M.Phil. leading to Ph.D. degree program after successful completion of 24 CH Courses and passing the Comprehensive Examination are required to complete additional 9 CHs Courses from the Major Courses given above (under section II) other than their chosen discipline. For example, candidates seeking degree in Geology will select any 9 CHs major courses in disciplines other than Geology (i.e., Geophysics, Environmental Geosciences and Geospatial Sciences).

The scholars who have earned MS/M.Phil. degrees and are directly enrolled in Ph.D. degree program are required to take 12 CHs courses from the Major Courses given above (under section II) other than their chosen discipline. For example, candidates seeking degree in Environmental Geosciences will select any 12 CHs major courses in disciplines other than Environmental Geosciences (i.e., Geology, Geophysics and Geospatial Sciences). Preferably the selected courses will be other than those taken in their MS/M.Phil. degree.